River Herring Technical Expert Working Group (TEWG)

Genetics Subgroup Webinar/Conference Call
April 24, 2014
1:00 - 3:00 pm

Summary

I. Overview

The Genetics Subgroup of the River Herring Technical Expert Working Group was established to "consider issues related to population stock structure rangewide. Also, discuss possible effects from hybridization, understanding the effects of stocking on genetic diversity, and any impacts landlocked populations may have on anadromous forms" in order to help contribute to the expected products of the TEWG. Dan Hasselman, chair of the Genetics Subgroup, convened a call on April 24, 2014, to begin discussions with the subgroup. The draft agenda for the meeting included topics such as invite West Coast participants to the subgroup and begin identifying research needs in the area of genetics. Meeting materials included a draft of research recommendations, compiled by Dan, that included input from the Atlantic States Marine Fisheries Commission stock assessment and Endangered Species Act listing decision. This meeting summary includes the primary discussion topics and outcomes to contribute to future TEWG discussions. The information provided below reflects individual expert opinion and not consensus.

II. Key Topics

The below includes a list of individual expert opinion provided by Genetics Subgroup members or the public on various overarching topics. Some ideas have been combined where appropriate.

- The subgroup discussed extending an invitation to West Coast scientists who are working on genetics in Pacific salmon.
- Molecular marker development was discussed at length. Single nucleotide polymorphisms (SNPs) provide many benefits over microsatellites, and would help address many of the outstanding questions on river herring evolution, ecology, and management. The subgroup discussed further development of this method, and potential collaborations with other labs to advance river herring research. The lack of standardized methodologies across laboratories was noted as a problem.
- Otolith microchemistry was discussed and it was acknowledged that it would be helpful to obtain input from others as well who have expertise in this issue (e.g., Karin Limburg, State University of New York, who is also a TEWG member).
- Examination of adaptive genetic variation was mentioned as a means to identify which populations are 'significant' in the context of long-term persistence. Some members of the subgroup noted the impact of climate change and marine mortality on river herring's adaptive ability.

- The subgroup discussed the various research recommendations related to genetics (outlined in Hasselman's Synopsis of Research Recommendations) and individual expert opinions are included below
- Funding opportunities were discussed and the need for additional funding was acknowledged. These topics will be explored further once research projects are finalized by the subgroup.

III. Key Outcomes

The below includes a list of individual expert opinions provided by participants related to specific threats, data gaps, research projects, conservation actions, information to be considered and/or monitoring (i.e., the identified research projects and/or conservation actions). Some ideas have been combined where appropriate. These outcomes are listed in no particular order, and those related to other subgroups are also included in the "Cross-Cutting Issues" section below.

a. Threats
   - Genetic homogenization due to effects from stock transfers –decreases genetic differentiation and jeopardizes evolutionary potential (i.e., capacity to respond to future perturbations like climate change)

b. Data Gaps
   - Understanding relative contribution of wild vs. hatchery broodstock to progeny in different river systems
   - Understanding the relative contribution of each population to species level standing genetic variation

c. Research Projects
   - Please see Hasselman's Synopsis of Research Recommendations

d. Information To Be Considered (e.g., published papers)
   - The subgroup discussed compiling a list of sampling (e.g., scale) archives for use in future research.

IV. Next Steps

The Genetics Subgroup discussed the following next steps:

- Invite John Carlos Garza and Eric Anderson (both of the Southwest Fisheries Science Center; Santa Cruz, CA) to the Genetics Subgroup as unofficial members.
- An idea for a future call included the integration of otolith and genetics science.
- Dan will edit Hasselman's Synopsis of Research Recommendations based on discussing during the call

V. Cross-Cutting Subgroup Issues

The following cross-cutting subgroups issues were discussed and will be further considered by the TEWG and its Ecosystem Integration Committee.

- Microsatellites can be used to determine effective population size which overlaps with Stock Status Subgroup and their need to understand census population size.
- Database with sources and availability of archival river herring samples would help inform research.
- Predation effects on river herring can be assessed by using genetics to identify stomach contents.
- Generate a standardized (lethal and non-lethal) sampling protocol to be used for all future river herring research that can be adopted by every state/province involved in regular monitoring efforts.
- Dedicated monitoring is needed at range edges (alewife: North Carolina and Quebec/Newfoundland; blueback herring: Florida and New Brunswick/Nova Scotia) - the genotyping of larvae provides large sample sizes and information on presence/absence of successful reproduction in drainages.
- Determine which stocks and populations are susceptible to bycatch in open ocean fisheries (e.g., Atlantic herring and mackerel), as well as other sources of mortality (dams, etc.).
- River herring funding is needed and non-traditional opportunities may need to be considered to obtain the needed funds.
- Monitoring genetic diversity at different life history stages: larvae vs. YOY/juveniles vs spawning adults. Is genetic diversity being lost at a specific stage in the life cycle?

VI. Participants

The affiliation of each member can be found on the subgroup roster available at the TEWG Genetics Subgroup website:
http://www.nero.noaa.gov/protected/riverherring/tewg/genetics/index.html

a. <u>Subgroup Members</u>
Dan Hasselman
Mike Bailey
Lisa Kerr
Eric Palkovacs
Eric Schultz
Tom Schultz

b. <u>Staff</u>
Marin Hawk
Diane Borggaard

VII. Meeting Materials

The following materials were provided to support the meeting. Additional information can be found at the TEWG Genetics Subgroup website:
http://www.nero.noaa.gov/protected/riverherring/tewg/genetics/index.html

a. Draft Agenda
b. Hasselman's Synopsis of Research Recommendations